

FQ5-515

24

## Claims:

1. A shaper for controlling a plurality of flows of packets, comprising:

a packet buffer for storing packets for each of the flows of packets;

5 a content-addressable memory for storing a plurality of scheduled transmission times at different addresses each corresponding to the flows of packets;

a timer counting a current time; and

a current-time searcher for searching the

10 content-addressable memory for a scheduled transmission time matching the current time to determine whether a packet to be transmitted at the current time exists.

2. A shaper for controlling a plurality of flows of packets, comprising:

15 a packet buffer for storing packets for each of the flows of packets;

a content-addressable memory for storing a plurality of scheduled transmission times, at each of which at least one packet is to be transmitted;

20 a packet management table for storing linkage information indicating a linkage of a plurality of packets that are to be transmitted at a same scheduled transmission time;

FQ5-515

25

a timer counting a current time;  
a current-time searcher for searching the content-addressable memory for a scheduled transmission time matching the current time; and

5 a packet transmission controller for transmitting at least one packet at the scheduled transmission time matching the current time by referring to the packet management table.

3. A shaper according to claim 2, further comprising:

10 a scheduler for calculating a transmission time of an input packet based on its predetermined traffic;  
a same-time searcher for searching the content-addressable memory to determine whether the calculated transmission time matches a scheduled transmission time that has been already registered in the content-addressable memory;

15 and

20 a transmission registration controller for adding the input packet to the linkage for the calculated scheduled transmission time in the packet management table, when the calculated transmission time matches a scheduled transmission time that has been already registered in the content-addressable memory.

4. A shaper according to claim 3, further comprising:

a data update controller for eliminating the scheduled transmission time matching the calculated

FQ5-515

26

transmission time from entries to be searched for in the content-addressable memory.

5. A shaper according to claim 4, wherein the data update controller removes a packet that has been transmitted from a corresponding linkage stored in the packet management table.

6. A shaper according to claim 4, wherein the data update controller uses a valid/invalid flag to determine whether a scheduled transmission time is eliminated from 10 entries to be searched for in the content-addressable memory.

7. A shaper according to claim 3, wherein the transmission registration controller registers a flow number of the input packet into the content-addressable memory as an address of the content-addressable memory, when the calculated 15 transmission time does not match any scheduled transmission time of the content-addressable memory.

8. A shaper according to claim 3, wherein the scheduler calculates a transmission time of an input packet so as to meet its predetermined traffic parameter.

20 9. A scheduling method for use in a shaper controlling a plurality of flows of packets, comprising the steps of:

a) calculating a transmission time of an input packet based on its predetermined traffic;

5 b) searching a content-addressable memory to determine whether the calculated transmission time matches a scheduled transmission time that has been already registered in the content-addressable memory;

10 c) when the calculated transmission time matches a scheduled transmission time that has been already registered in the content-addressable memory, adding the input packet to a linkage for the calculated scheduled transmission time in a packet management table;

15 d) when the calculated transmission time does not match any scheduled transmission time of the content-addressable memory, registering a flow number of the input packet into the content-addressable memory as an address of the content-addressable memory;

e) searching the content-addressable memory for a scheduled transmission time matching a current time at predetermined intervals; and

20 f) transmitting at least one packet at the scheduled transmission time matching the current time by referring to the packet management table.

10. A scheduling method according to claim 9, further comprising the step of:

25 eliminating the scheduled transmission time

FQ5-515

28

matching the calculated transmission time from entries to be searched for in the content-addressable memory.

11. A scheduling method according to claim 10, further comprising the step of:

5 removing a packet that has been transmitted from a corresponding linkage stored in the packet management table.

12. A scheduling method according to claim 9, wherein a transmission time of an input packet is calculated so as to meet its predetermined traffic parameter.